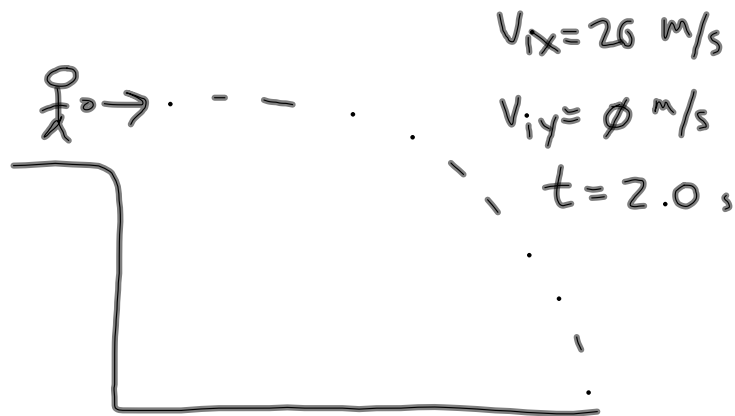


HW 5 #46:

a) show that final velocity = 28 m/s

Velocity vector diagram showing the horizontal component $v_{fx} = 20 \text{ m/s}$ and the vertical component v_{fy} . The resultant velocity v_f is the hypotenuse. The angle θ is between v_{fx} and v_f .

$$v_{fy} = v_{iy} + a_y t$$

$$= (-9.8 \text{ m/s}^2)(2 \text{ s})$$

$$= -19.6 \text{ m/s}$$

$$v_f^2 = v_{fx}^2 + v_{fy}^2$$

$$v_f = \sqrt{(20 \text{ m/s})^2 + (-19.6 \text{ m/s})^2}$$

$$= 28 \text{ m/s}$$

b) at what angle does ball hit ground?

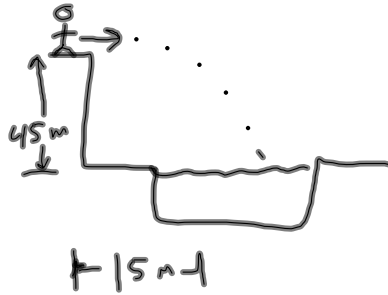
$$\tan \theta = \frac{v_{fy}}{v_{fx}}$$

$$\theta = \tan^{-1} \left(\frac{19.6 \text{ m/s}}{20 \text{ m/s}} \right)$$

$$= 44.4^\circ$$

Homework 5 Review CP Physics

42:



find $t \rightarrow$ jumping horizontally, so $\bar{v}_{iy} = 0 \text{ m/s}$

$$\Delta y = \cancel{v_{iy}t} + \frac{1}{2}a_y t^2$$

$$\begin{aligned} t &= \sqrt{\frac{2\Delta y}{a_y}} \\ &= \sqrt{\frac{2(-45\text{m})}{-9.8\text{m/s}^2}} \\ &= 3.03\text{s} \end{aligned}$$

find v_{ix} :

$$\Delta x = v_{ix}t$$

$$\begin{aligned} v_{ix} &= \frac{\Delta x}{t} \\ &= \frac{15\text{m}}{3.03\text{s}} \\ &= 4.95\text{m/s} \end{aligned}$$